Table 1 Crossing Licenses For Existing C-129 Line

Town	Water Body	Structures	NHPUC Order Number	Current Petition Appendix	
Nottingham					
	Bean River				
		21 to 22	Not Previously	. Δ	
	North River		Licensed	11	
			Not Previously		
		47 to 53	Licensed	В	
	Little River				
		77 to 79	Not Previously	C	
Barrington					
	Oyster River	104 to 105	Not Previously Licensed	D	
	Bellamy River		Not Previously		
		148 to 149	Licensed	Е	
Rochester					
	Isinglass River	208 to 211	Not Previously Licensed	F	













See Detail AA Below	
0177029 rm, Washer, Sq. Curved 4"x 4" for 7/8" Bolt 0176794	-
Washer Coil Spring, 7/8"	
FIGURE 4A	
Transmission Business	
etall A DATE hment & Guying	
Wood Poles DRAMING NO. DA-2	



<u>APPENDIX A</u> C-129 BEAN RIVER NOTTINGHAM, NH

1. The location of this crossing is shown on the attached location map marked as Exhibit 1.

2. The design and proposed construction of this crossing is shown on the attached PSNH Transmission Drawing entitled "C129 LINE (115 KV), BETWEEN STRUCTURES 21 & 22, BEAN RIVER WATER CROSSING NOTTINGHAM, NEW HAMPSHIRE" (Drawing No. 7649-607) marked as Exhibit 2.

3. Line C-129 will cross the Bean River on Type A, H-Frame, 1-55' and 1-60' (West) and 2-60' (East), wood tangent structures with a span of 495'. A detail drawing of these structures has been provided with the petition as FIGURE 2. As shown in FIGURE 2, the phase wires are spaced 14' horizontally. The static wire is carried on the structure above the phase wires by two support brackets approximately 6'-10" vertically and 6'-0" horizontally to the closest phase wire.

4. Flood water elevations for the Bean River were based on information contained in flood insurance rate maps (FIRM) and studies provided by FEMA. The FIRM number for the Bean River is 33015C0095E with an effective date of May 17, 2005. The panel number for this FIRM is 0095E. The flood insurance study number for this River is 33015CV001A and 33015CV002A. The 100-year flood elevation for this portion of the River is approximately 269'. No information was available for the 10-year flood elevation for this portion of the River. However, it should be noted that the 100-year elevation, which these lines were designed to safely exceed, would be well above the 10-year flood elevation. The area of the crossing, as required by the NESC (Table 232-1.7, Note 19), is approximately 15.2 acres. This is based on the total area of the River for a 1-mile stretch in either direction of the crossing (125' x 5,280')/43,560 sf/ac = 15.2). As stated in paragraph 9 of the petition, the minimum required 115 kV conductor clearances for water surface area less than 20 acres is 22.1'.

- 19#10 Static wire Due to the fact that the static wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- NESC Heavy Loading The maximum conductor sag for this weather case will be 8.4' with a clearance to the water surface of 32.9'.

- 285 degrees F Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be approximately 14' with a clearance to the water surface of 27.3'. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 22.1' by 5.2' under temporary emergency conditions during a 100yr storm event.
- Minimum phase to static clearance Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.3", or approximately 4.8' [29" + (120.8 kV-50 kV) x 0.4"]. Due to the fact that the minimum distance the static wire can hang to the closest phase wire is 6'-0", based on FIGURE 2, the C-129 will always meet minimum phase to static clearances in any weather condition.





THIS PLAN IS FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

Pub Nev	olic Service v Hampsh	e of ire	Tra	nsmission Business
N IED IED	BE BE NO	C129 L TWEEN STF AN RIVER TTINGHAM,	INE (1 RUCTUR WATE NEW	15 KV) PES 21 & 22 F R CROSSING HAMPSHIRE
VED	SCALE 1"=200'	DATE 2/11/2011	SHEET	DRAWING NO. D-7649-607

APPENDIX B

C-129 NORTH RIVER NOTTINGHAM, NH

1. The location of this crossing is shown on the attached location map marked as Exhibit 3.

2. The design and proposed construction of this crossing is shown on the attached PSNH Transmission Drawing entitled "C129 LINE (115 KV), BETWEEN STRUCTURES 47 & 53, NORTH RIVER WATER CROSSING, NOTTINGHAM, NEW HAMPSHIRE" (Drawing No. 7649-608) marked as Exhibit 4.

3. Line C-129 will cross the North River on two, 90' Type RAX tangent structures. The span length between the two structures is 800'. A detail drawing of these structures has been provided with the petition as FIGURE 3. As shown in FIGURE 3, the phase wires are spaced 14' horizontally. The static wire is carried on the structure above the phase wires approximately 10'-9" vertically and 6'-0" horizontally to the closest phase wire. Additional structures that are located in the wetland and on the plan and profile are Types D and A structures. As seen in FIGURE 1, the phase wires on a Type D structure are spaced 14' horizontally. The static wire is carried on the structure above the phase wires by two support brackets approximately 7'-3" vertically and 6-0" horizontally to the closest phase wire. As shown on FIGURE 2, the phase wires on a Type A structure are spaced 14' horizontally. The static wire is carried on the structure above the phase wires by two support brackets approximately 6'-10" vertically and 6'-0" horizontally to the closest phase wire.

4. Flood water elevations for the North River were based on information contained in flood insurance rate maps (FIRM) and studies provided by FEMA. The FIRM number for the North River is 33015C0115E with an effective date of May 17, 2005. The panel number for this FIRM is 0115E. The flood insurance study number for this River is 33015CV001A and 33015CV002A. The 100-year flood elevation for this portion of the River is approximately 240'. No information was available for the 10-year flood elevation for this portion of the River. However, it should be noted that the 100year elevation, which these lines were designed to safely exceed, would be well above the 10-year flood elevation. The portion of the River, at the location of this crossing, is not suitable for sail boating as defined by the NESC for the following reasons: Under normal flow conditions the channel depth of the River is approximately one foot deep. To the south, the River is impounded by a box culvert at Route 152 at an elevation of 240' to the top of the culvert. Under flood conditions no vessel would be able to pass through the culvert as it would be flowing full (elev. 240-ft). This culvert is located 211 ft to the West of the crossing. To the north and east of the crossing the River splits and is again culverted at Freeman Hall and Priest Roads. At Freeman Hall Road, located outside of the flood zone and a much higher elevation (299-ft) no sailboat would be able to reach the impoundment. As this is the beginning of the River, FEMA clearly states that this

section would not flow outside of its banks and would have a depth of 1-ft during a 100 year flood. The clearance of a boat under flood conditions through the Priest Road culvert would be 4' (elev. 244-ft) and not suitable for a sail boat. These obstructions are located 1.10 miles and .5 miles respectively from the location of the crossing. In between these obstructions is a delineated wetland area. This area has no access roads or boat ramps to launch a sailboat. Natural wetland vegetation, including grasses and shrubs greater that 4-ft tall, would prevent free navigation of the wetlands under flood conditions through this area. Due to the two obstructions and lack of access in between, PSNH has concluded that this area of the River is not suitable for sail boating. As stated in paragraph 9 of the petition, the minimum required 115 kV conductor clearances for waters unsuitable for sail boating is 18.6'.

- 19#10 Static wire Due to the fact that the static wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- NESC Heavy Loading The maximum conductor sag for this weather case will be 24.4' with a clearance to the water surface of 32.5'.
- 285 degrees F Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be approximately 38' with a clearance to the water surface of 18.9'. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 18.6' by 0.3' under temporary emergency conditions during a 100yr storm event.
- Minimum phase to static clearance Minimum phase to static clearance Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.3", or approximately 4.8' [29" + (120.8 kV-50 kV) x 0.4"]. Due to the fact that the minimum distance the static wire can hang to the closest phase wire is 6'-0", based on FIGURE 3, the C-129 will always meet minimum phase to static clearances in any weather condition.







-795 ACSR 26/7 (TYP.) SHOWN @ NESC HVY. (30°F, ½″ICE, 4 LBS. WIND)

EXHIBIT 4								
ic Service Hampshii	of re	Transmission Business						
C129 LINE – 115 KV BETWEEN STRUCTURES 47 & 53 NORTH RIVER WATER CROSSING NOTTINGHAM, NEW HAMPSHIRE								
SCALE 1"=200'	E 011	SHEET _1_0F_2_	DRAWING	NO. 7649-608				

APPENDIX C

C-129 LITTLE RIVER NOTTINGHAM, NH

1. The location of this crossing is shown on the attached location map marked as Exhibit 5.

2. The design and proposed construction of this crossing is shown on the attached PSNH Transmission Drawing entitled "C129 LINE (115 KV), BETWEEN STRUCTURES 77 & 79, LITTLE RIVER WATER CROSSING, NOTTINGHAM, NEW HAMPSHIRE" (Drawing No. 7649-609) marked as Exhibit 6.

3. Line C-129 will cross the Little River on a 95' Type DA deadend structure and a 90' Type DA deadend structure with a span of 1000'. A detail drawing of these structures has been provided with the petition as FIGURE 4 and FIGURE 4A. As shown in FIGURE 4 and FIGURE 4A the phase wires have an approximate separation of 14' horizontally. The static wire is carried on the structure above the phase wires approximately 7' 6" vertically and 7' horizontally from the closest phase wire. Both structures are located outside the wetland boundary. A clearance 22.6' to the highest point in the wetland has been provided for any truck traffic operating during frozen or matted conditions since this is the lowest clearance to ground that a truck may encounter. This clearance exceeds the 20.1' requirement of the NESC.

4. Flood water elevations for the Little River were based on information contained in flood insurance rate maps (FIRM) and studies provided by FEMA. The FIRM number for the Little River is 33015C0115E with an effective date of May 17, 2005. The panel number for this FIRM is 0115E. The flood insurance study number for this River is 33015CV001A and 33015CV002A. The 100-year flood elevation for this portion of the River is approximately 187'. No information was available for the 10-year flood elevation for this portion of the River. However, it should be noted that the 100year elevation, which these lines were designed to safely exceed, would be well above the 10-year flood elevation. The portion of the River at the location of this crossing is not suitable for sail boating as defined by the NESC for the following reasons: To the North of the crossing, the Little River enters a culvert under Route 4 with a top elevation of 197'. To the south of the crossing is a culvert at Kennard Road with an elevation of 178'. Under normal flow conditions the depth of the River is around one foot, and not capable of allowing a sailboat to traverse. During a flood event a sail boat would not be able to pass under either culvert as the FEMA map shows the flood waters passing over the road. In between these road crossings is delineated wetland where there is no access or boat ramps to launch a boat. Due to the two obstructions and lack of access in between, PSNH has concluded that this area of the River is not suitable for sail boating. As stated in paragraph 9 of the petition, the minimum required 115kV conductor clearances for waters unsuitable for sail boating is 18.6'.

- 19#10 Static wire Due to the fact that the static wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- NESC Heavy Loading The maximum conductor sag for this weather case will be 34.6' with a clearance to the water surface of 29.0'.
- 285 degrees F Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 41.0' with a clearance to the water surface of 22.6'. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 18.6' by 4.0' under temporary emergency conditions during a 100-yr storm event.
- Minimum phase to static clearance Minimum phase to static clearance Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.3", or approximately 4.8' [29" + (120.8 kV-50 kV) x 0.4"]. Due to the fact that the minimum distance the static wire can hang to the closest phase wire is 6'-0", based on FIGURE 3, the C-129 will always meet minimum phase to static clearances in any weather condition.





<u>APPENDIX D</u> OYSTER RIVER BARRINGTON, NH

1. The location of this crossing is shown on the attached location map marked as Exhibit 7.

2. The design and proposed construction of this crossing is shown on the attached PSNH Transmission Drawing entitled "C-129 LINE (115 KV), BETWEEN STRUCTURES 104 & 105, OYSTER RIVER WATER CROSSING, BARRINGTON, NEW HAMPSHIRE" (Drawing No. 7649-610) marked as Exhibit 8.

3. Line C-129 will cross the Oyster River on two 50' Type A wooden tangent structures with a span of 505'. A detail drawing of these structures has been provided with the petition as FIGURE 2. As shown in FIGURE 2, the phase wires are spaced 14' horizontally. The static wire is carried on the structure above the phase wires by two support brackets approximately 6'-10" above and 6'-0" horizontally to the closest phase wire.

4. Flood water elevations for the Oyster River were based on information contained in flood insurance rate maps provided by FEMA. The FIRM number for the Oyster River is 33017C0295D with an effective date of May 17, 2005. The panel number for this FIRM is 0295D. The flood insurance study number for this River is 33017CV00A. According to FEMA this section of the River is not expected to leave its channel, an approximate elevation of 191' for the 100 year flood. No information was available for the 10-year flood elevation for this portion of the River. However, it should be noted that the design elevation (100-year flood elevation), would be well above the 10-year flood elevation. The area of the crossing, as required by the NESC (Table 232-1.7, Note 19), is approximately 26.7 acres. This is based on the total area of the River for a 1-mile stretch in either direction of the crossing (33' x 5,280')/43,560 sf/ac = 4.00 ac). As stated in paragraph 9 of the petition, the minimum required 115 kV conductor clearances for water surface areas less than 20 acres is 22.1'.

- 19#10 static wire Due to the fact that the static wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- NESC Heavy Loading The maximum conductor sag for this weather case will be 10.0' with a clearance to the water surface of 27.4'
- 285 degrees F Max operating temperature (Phase wires) based on PSNH transmission standards The maximum conductor sag for this

weather case will be 15.5' with a clearance to the water surface of 22.4'. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 22.1' by 0.3' under temporary emergency conditions during a 100-yr design storm event.

Minimum phase to static clearance – Minimum phase to static clearance – Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.3", or approximately 4.8' [29" + (120.8 kV-50 kV) x 0.4"]. Due to the fact that the minimum distance the static wire can hang to the closest phase wire is 6'-0", based on FIGURE 3, the C-129 will always meet minimum phase to static clearances in any weather condition.









<u>APPENDIX E</u> C-129 BELLAMY RIVER BARRINGTON, NH

1. The location of this crossing is shown on the attached location map marked as Exhibit 9.

2. The design and proposed construction of this crossing is shown on the attached PSNH Transmission Drawing entitled "C129 LINE (115 KV), BETWEEN STRUCTURES 148 & 149, BELLAMY RIVER WATER CROSSING BARRINGTON, NEW HAMPSHIRE" (Drawing No. 7649-611) marked as Exhibit 10.

3. Line C-129 will cross the Bellamy River on 50' Type A, H-Frames (without a bayonet bracket), with a span of 481'. A detail drawing of these structures has been provided with the petition as FIGURE 5. As shown in FIGURE 5, the phase wires are spaced 14' horizontally. The static wire is carried on the structure above the phase wires by two support bayonets approximately 5'-6" vertically and 7'-0" horizontally to the closest phase wire.

4. Flood water elevations for the Bellamy River were based on information contained in flood insurance rate maps (FIRM) and studies provided by FEMA. The FIRM number for the Bellamy River is 33017C0285D with an effective date of May 17, 2005. The panel number for this FIRM is 0285D. The Flood Insurance Study number for this River is FIS33017CV000A. Based on this FEMA Flood Insurance study and FIRM map, PSNH concluded that the 10-year flood elevation is approximately 4' above the elevation at the stream bed. Also from the flood insurance study, it was determined that the Bellamy River has an average water depth of around a foot. Subtracting the difference between the 10-year flood elevation above the stream bed and the average water depth, PSNH concluded that the 10-year flood elevation for this portion of the River is at 214'. The area of the crossing, as required by the NESC (Table 232-1.7, Note 19), is approximately 12.1 acres. This is based on the total area of the River for a 1-mile stretch in either direction of the crossing $(100' \times 5,280')/43,560 \text{ sf/ac} = 12.12)$. As stated in paragraph 9 of the petition, the minimum required 115 kV conductor clearances for water surface area less than 20 acres is 22.1'.

5. The sags and clearances to the water surface during a 10-year flood event for this crossing are as follows;

• 7#8 Static wire – Due to the fact that the static wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.

- NESC Heavy Loading The maximum conductor sag for this weather case will be approximately 11.0' with a clearance to the water surface of 40.2'.
- 285 degrees F Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be approximately 14' with a clearance to the water surface of 30.4'. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 22.1' by 8.3' under temporary emergency conditions during a 10yr storm event.
- Minimum phase to static clearance Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.3", or approximately 4.8' [29" + (120.8 kV-50 kV) x 0.4"]. Due to the fact that the minimum distance the static wire can hang to the closest phase wire is 7'-0", based on FIGURE 5, the C-129 will always meet minimum phase to static clearances in any weather condition.





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EXHIBIT 10

Pub New	lic Service Hampshi	e of ire	Tra	Transmission Business				
DRAWN WNT DESIGNED MTM CHECKED MTM	C129 LINE (115 KV) BETWEEN STRUCTURES 148 & 149 BELLAMY RIVER WATER CROSSING BARRINGTON, NEW HAMPSHIRE							
APPROVED DSD	scale 1"=200'	DATE 2/11/2011	SHEET <u>1_0F_2</u>	DRAWING NO. D-7649-611				

APPENDIX F

C-129 ISINGLASS RIVER ROCHESTER, NH

1. The location of this crossing is shown on the attached location map marked as Exhibit 11.

2. The design and proposed construction of this crossing is shown on the attached PSNH Transmission Drawing entitled "C129 LINE (115 KV), BETWEEN STRUCTURES 208 & 211, ISINGLASS RIVER WATER CROSSING, ROCHESTER, NEW HAMPSHIRE" (Drawing No. 7649-612) marked as Exhibit 12.

3. Line C-129 will cross the Isinglass River twice. One span consists of a 50' Type A tangent structure (without a bayonet bracket) and a 55' Type A tangent structure (without a bayonet bracket) with a span length of 440', and the other span consists of a 55' Type A tangent structure (without a bayonet bracket) and a 50' Type A tangent structure (without a bayonet bracket) with a span length of 602'. A detail drawing of these structures has been provided with the petition as FIGURE 5. As shown in FIGURE 5, the phase wires are spaced 14' horizontally. The static wire is carried on the structure above the phase wires by two support bayonets approximately 5'-6" vertically and 7'-0" horizontally to the closest phase wire. A clearance of 23.1' to the highest point in the wetland during normal conditions has been provided for any truck traffic operating during frozen or matted conditions since this is the lowest clearance to ground that a truck may encounter. This clearance exceeds the 20.1' requirement of the NESC.

Flood water elevations for the Isinglass River were based on information 4. contained in flood insurance rate maps (FIRM) and studies provided by FEMA. The FIRM number for the Isinglass River is 33017C0213D with an effective date of May 17, 2005. The panel number for this FIRM is 0213D. Information from FEMA regarding the 10-year flood elevation for this portion of the River is not available. Utilizing flood-plain overlays for the 100-year flood event provided by FIRM panel 0213D, it was determined that the 100-year flood elevation for this portion of the River is at 160', which is 4 feet above the normal surface water elevation of 156'. It should be noted that the 100-year elevation, which these lines were designed to safely exceed, would be well above the 10year flood elevation. The portion of the River at the location of this crossing is not suitable for sail boating as defined by the NESC for the following reasons: Approximately 0.6 miles to the southeast of the crossing, the Isinglass River flows under a small bridge along Route 125 in Rochester, NH. Approximately 1 mile to the southwest of the crossing is another small bridge along Green Hill Road in Rochester, NH. During both a normal and flood event a sail boat would not be able to pass under either bridge as the water would be close to the bottom of the bridge. In between these road crossings there is no access or boat ramps to launch a boat. Due to the two obstructions, lack of access in between, and several other obstructions within the River itself, PSNH has

concluded that this area of the River is not suitable for sail boating. As stated in paragraph 9 of the petition, the minimum required 115kV conductor clearance for waters unsuitable for sail boating is 18.6'.

- 7#8 Static wire Due to the fact that the static wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- NESC Heavy Loading The maximum conductor sag for this weather case will be approximately 16.0' with a clearance to the water surface of 34.8'.
- 285 degrees F Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 31.7' with a clearance to the water surface of 19.1'. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 18.6' by 0.5' under temporary emergency conditions during a 100-yr storm event.
- Minimum phase to static clearance Minimum phase to static clearance Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.3", or approximately 4.8' [29" + (120.8 kV-50 kV) x 0.4"]. Due to the fact that the minimum distance the static wire can hang to the closest phase wire is 7'-0", based on FIGURE 5, the C-129 will always meet minimum phase to static clearances in any weather condition.



						DRAWN	Public	Service		Transmission
						WNT	of New	Hampshi	re	Business
				[DESIGNED		LOCA	ATION	PLAN
						МТМ	C129 LINE (115 KV)			15 KV)
						CHECKED	ISINGLASS RIVER WATER CROSSING			TER CROSSING
						<i>MTM</i>	RC	CHESTER,	NEW	HAMPSHIRE
						APPROVED	SCALE	DATE	SHEET	DRAWING NO.
NO.	REVISION	DATE	DRWN	CHCK	APPR	DSD	1"=2000'	3/22/2011	2_0F_2	D-7649-612A



Pub New	lic Service Hampshi	e of ire	Tra	Transmission Business			
DRAWN WNT DESIGNED MTM CHECKED MTM	BET ISING RC	C129 L WEEN STRU LASS RIVI OCHESTER,	INE (1 JCTURE E R WA NEW	15 KV) S 208 & 211 TER CROSSING HAMPSHIRE			
APPROVED DSD	scale 1"=200'	date 2/11/2011	SHEET OF	DRAWING NO. D-7649-612			